We claim:

1. A structured catalyst comprising channels of a geometry comprising inner walls whose cross-sectional surfaces are substantially free of acute and sharply obtuse interior corner angles, the catalyst being used for liquid/catalyst and gas/liquid/catalyst contacting and reaction.

2. The structured catalyst in accordance with claim 1, wherein said channels form at least a part of a honeycomb monolith catalyst structure.

3. The structured catalyst in accordance with claim 1, wherein said inner walls of said channels support a solid catalyst.

4. The structured catalyst in accordance with claim 3, wherein said solid catalyst is disposed upon or within said inner walls of said channels.

5. The structured catalyst in accordance with claim 1 wherein said channels have an average cross-sectional diameter in the range of about 0.1 to 10 mm.

6. The structured catalyst in accordance with claim 1 wherein said inner walls of said channels are substantially free of corners.

7. The structured catalyst in accordance with claim 1 wherein said inner walls of said channels have corner radii of above approximately ten percent of their channel diameter.

8. The structured catalyst in accordance with claim 1 wherein said inner walls of said channels define an approximately circular cross-section.

~~9~~. A structured catalyst of honeycomb configuration comprising a plurality of parallel channels bounded by catalytically active walls traversing the catalyst from an inlet end to an outlet end thereof, wherein the cross-sectional shape of the channels is free of angled corners and free of curvatures having curvature radii below 10% of the average channel diameter.

~~10~~. A method for carrying out a liquid/solid or gas/liquid/solid reaction comprising the step of conveying a liquid or gas/liquid feedstream through a solid catalyst of honeycomb configuration comprising a plurality of parallel channels bounded by catalytically active walls traversing the catalyst from an inlet end to an outlet end thereof, wherein the cross-sectional shape of the channels is free of angled corners and free of curvatures having curvature radii below 10% of the average channel diameter.

11. The method in accordance with claim 10 wherein said reaction comprises a liquid/catalyst contacting and reaction.

12. The method in accordance with claim 10 wherein said reaction comprises a gas/liquid/catalyst reaction.

13. The method in accordance with claim 10 wherein said channels are utilized for conducting gas/liquid/catalyst hydrotreating reactions.

14. The method in accordance with claim 10 wherein said channels are utilized for conducting gas/liquid/catalyst hydrogenation reactions.

15. The method in accordance with claim 10 wherein said reaction is conducted under conditions of liquid linear velocity of between approximately 0.01 and 100 cm/s.

16. The method in accordance with claim 12 wherein said reaction is conducted under conditions wherein said feed has a gas/liquid volume ratio of between approximately 0 and 1000.

~~17~~. A method for carrying out a hydrotreating reaction comprising the step of conveying a gas/liquid feedstream through a solid catalyst of honeycomb configuration comprising a plurality of parallel channels bounded by catalytically active walls traversing the catalyst from an inlet end to an outlet end thereof, wherein the cross-sectional shape of the channels is free of angled corners and free of curvatures having curvature radii below 10% of the average channel diameter.

~~18~~. A method for carrying out a gas-liquid mass-transfer process comprising the step of conveying gas and liquid feedstreams through a packing structure of honeycomb configuration comprising a plurality of parallel channels bounded by channel walls traversing the structure from an inlet end to an outlet end thereof, wherein the cross-sectional shape of the channels is free of angled

corners and free of curvatures having curvature radii below 10% of the average channel diameter.

19. A method in accordance with claim 18 wherein the gas-liquid mass transfer process is an absorption, scrubbing, stripping or distillation process.